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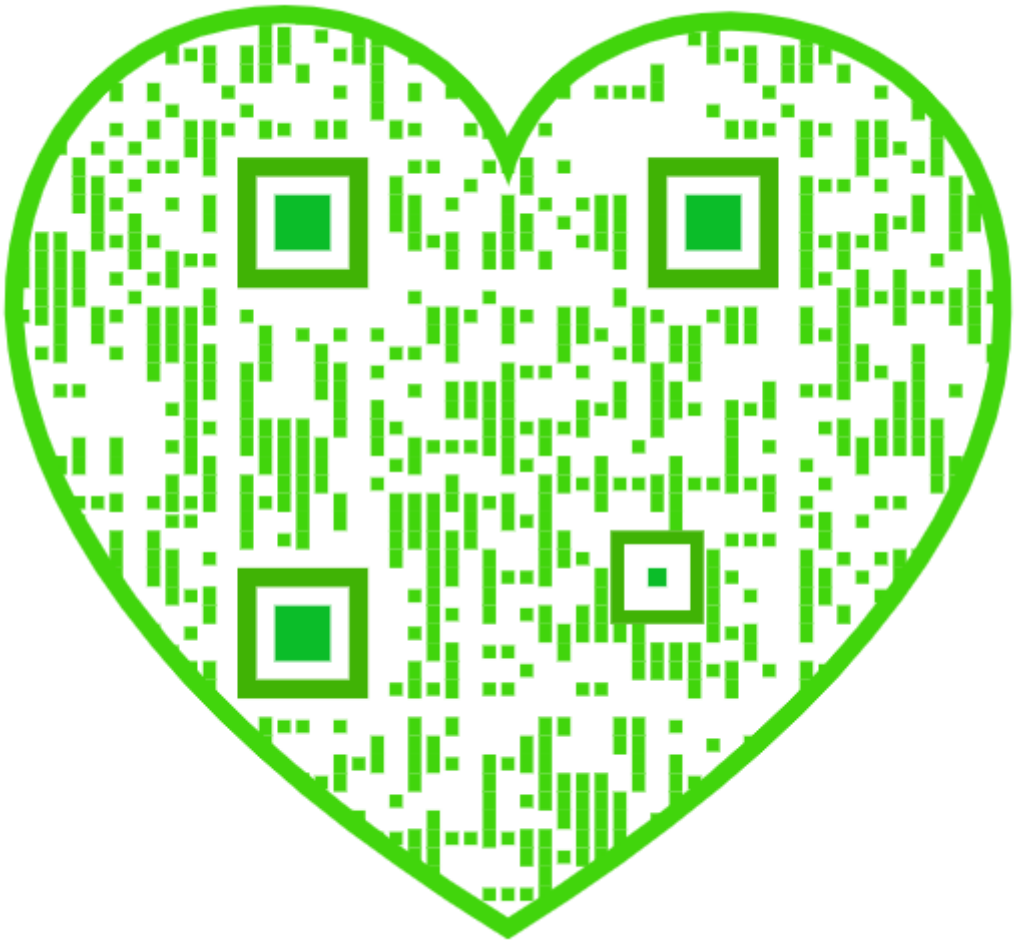

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Bulletin No. 33 April, 1921

THE
CONNECTICUT AGRICULTURAL COLLEGE
EXTENSION SERVICE
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STORRS, CONN.

Cooperative Extension Work in Agriculture and Home Economics, State of Connecticut, Connecticut Agricultural College and U. S. Department of Agriculture cooperating.

SPRING MANAGEMENT OF BEES.

By L. B. CRANDALL

The queen bee is the most important individual in the colony. We might almost say the queen is the colony. She lays the eggs which produce all the members of her colony, even that of her successor. If she is a strong, vigorous, Italian queen, her colony will be strong and active. If she comes from a strain that generally produces a large surplus crop of honey, under good management her bees will be likely to produce large crops of surplus honey. It is important, then, to see that the queen in each colony is a good one.

THINGS TO DO BEFORE UNPACKING.

The first thing to do for the bees in the spring, is to observe their flight as an indication of their condition. If the bees fly strong on pleasant days in spring, and are seen to bring in pollen and to visit damp places for water, it is an indication that the colony is in good condition.

Colonies which do not fly well and do not gather pollen and water when other colonies are doing it, are likely to be weak and may be queenless. If your records show that such colonies have old queens (more than two years old) you may conclude that they are queenless. Such colonies should be opened on the first warm day, soon after noon, and a careful inspection given. If no queen is found, and neither eggs or brood, a new queen should be secured at once, or the colony should be united with some strong colony.

Issued in Furtherance of the Acts of Congress of May 8 and June 30, 1914

Do not unite two weak colonies, but a weak one with a strong one! A weak colony at this time of year will have very few young bees, so that two weak colonies being united will be but little better able to build up than one alone.

Bees seem to need a little salt when producing brood. It is advisable to place within their reach a basin or shallow pan of dilute salt water as early in the spring as new pollen is available. In order for the bees not to be drowned in this solution, it is necessary to put in the pan some planer shavings or bits of wood which will float so that the bees may alight on these and keep out of the water. Unless salt is provided, the bees will procure their supply from unsanitary sources.

If it is necessary to introduce new queens in the spring, they must usually be ordered from the South. Northern breeders cannot supply queens much before May 15, at least in any quantity, so it is necessary to order them from southern breeders early in the winter. The very best time for several reasons for introducing new queens is the August before, but if this has not been done, and new queens are needed, they should be secured by the first of May if possible.

It takes about two months for a colony to build up strongly enough to get the most honey from any honey flow. In most parts of Connecticut the main honey flow begins about June 10—from the tenth to the fifteenth in normal seasons. Counting back two months from that time will give us April 15 as our starting point. In normal seasons, we should have our colonies begin brood rearing for the first batch not later than April 15. A very prolific queen, backed by a strong force of young bees, may produce a good colony after May 1, but it is unusual to get a colony strong enough for maximum production after that date. It will be evident, then, that it is much better to have the queens well established in the colonies before spring opens.

This is not to say that colonies which have queens introduced after May 1 will produce no surplus honey that season, but it is true that such colonies will produce but little from the first part of the clover flow. Colonies which begin building up May 15, should get some surplus from sumac, provided sumac gives a good flow, but not from clover. Colonies which are strong when new queens are introduced have a much better chance than weak colonies under the same conditions.

Spring Feeding.

If some of the colonies have come through the winter light in stores, they should be fed before being unpacked. It is important that the winter protection be left on the hives throughout the raw, changeable weather of April and early May.

Good honey which has been gathered and stored by the bees, is always the best food for them. This is especially true of the spring brood rearing period. It seems that the best granulated sugar syrup does not supply all the elements needed by the developing brood. However, honey which is not the best may be used for feeding at this time. That made from trees, such as the Basswood, and honey containing honeydew may be used in the spring, whereas it would not be the best for winter. If the beekeeper has not laid aside some combs for such an emergency, he can use syrup made by mixing equal volumes of granulated sugar and hot water, stirring the liquid until all the sugar has dissolved. Feed this hot in one of the many feeders procurable on the market.*

In order for colonies to develop in the shortest time, they must have an abundance of stores and large amounts of pollen. It takes a cell of honey to produce a cell of brood. It is a fact that queens will not lay their maximum number of eggs unless there is in the hives sufficient food to feed that amount of brood. It is best then in feeding colonies to give all they will need in one or two feedings and in the shortest time in which the bees will take it. On this account it is desirable to use more than one feeder for each colony.

Unpacking the Bees.

The time to remove the packing materials is when fairly settled weather has arrived in the spring. This will be usually just before the fruit trees bloom in May. We get our first important honey flow from red maples. The bees will get a good start from this stimulus so that when fruit bloom comes, they should build up rapidly. It is necessary that we have free access to the hives at this time so that we can manipulate the colonies as needed.

*See Bulletin No. 21, Fall Feeding of Bees.

After the packing is removed, each colony should be looked over carefully to ascertain its condition. We wish to know whether each has sufficient stores, whether the queen is laying well, whether she has all the room she needs, and whether there is any disease in the hives. The three essentials for every colony at this time are *stores*, *room*, and *protection*; of which stores and room are of the most importance. Colonies must have abundance of food or they cannot live and develop. If they have abundance of food but have not room in which to rear brood, they cannot become strong enough to produce surplus honey. A very common result of not providing room enough at this time of year is to induce swarming. Bees cannot cast swarms and produce surplus honey at the same time.

Building up Colonies in the Spring.

After the bees are taken out of winter quarters, they should be provided with all the room they need for brood rearing. If they were not wintered in two bodies, they should be given a second body at this time. If the colony is strong in young bees, it will make use of this second body very readily, but if it is slow about using the extra room, it may be well to raise two or three frames of brood from the bottom body into the center of the top one, in this way distributing the bees through both. A good queen will easily occupy two ten-frame bodies, and some extra good ones will do better than that. At this time of year an abundance of room for brood rearing is of great importance, because we cannot get a large crop of honey without a large force of field bees.

Disease Control.

It will be evident to every beekeeper after a little thought that it is impossible to build up strong colonies if disease is killing off the brood. There are two brood diseases of bees prevalent in this country that are of especial importance, called European and American Foulbrood.* These are both very destructive and very contagious. European Foulbrood gets in its most destructive work during the spring brood rearing period, but American Foulbrood may be present in

the hive at any season of the year. No beekeeper can make his colonies immune to these diseases, but he can do a great deal to keep his yards so clean and sanitary and his colonies so strong that it will be difficult for diseases to enter. Pure Italian stock seems to be more resistant to these diseases than black or hybrid stocks; also some strains of Italians seem to be more resistant than others. On this account it will pay every beekeeper to have only healthy, resistant Italian bees in his yards. Italian bees also have some other desirable traits, such as, gentleness, less tendency to swarm, good nectar gathering, and prolificacy in brood rearing, which make them the most desirable race to keep.

Swarming.

Swarming is the satisfying of the instinct for reproduction. In studying swarming, we do not consider the bee as an individual but the colony as the individual. When a colony divides, or swarms, another individual has been produced. It will be evident, then, that to control swarming we must combat the natural instinct for reproduction. It is a difficult problem. If bees were left to themselves, each colony would cast one or more swarms each year. Bees cannot produce surplus honey in any large amount and swarm, because the honey which they would store if they did not swarm is used in building new combs and in rearing brood. Colonies which are prevented from swarming are the ones which produce the largest amounts of surplus honey, other things being equal. Our object then as beekeepers is to prevent swarming so far as possible, since our aim is the production of surplus honey.

According to our best knowledge up to the present time, the chief cause of swarming is the over-production of young bees, i. e. having more young bees emerging than there are larvae to feed. The first work of the young bees after they emerge from the cells is to feed the larvae and build new combs. A good queen, backed by a strong force of young bees, will lay between two and three thousand eggs per day during this season of the year.

*See Farmers' Bulletins Nos. 975 and 1084.

Larvae have to be fed for six days, so it will be evident that it will not take long for more bees to emerge than there are new larvae to feed. These nurses being well prepared by Nature to produce baby food and build comb, and having neither of these to do, become uneasy and begin queen cells in preparation for swarming. In from eight to ten days from this time, unless the beekeeper prevents, we may expect a swarm.

What Takes Place When a Colony Swarms.

In order to judge the effect swarming has on honey production, let us see what takes place in the colony. One or two days before a colony swarms, most of the field bees which have been bringing in nectar and pollen, stop working. These bees remaining in the hive cause increased congestion. On the next bright, warm day toward noon, a bee here and there will become excited and start running through the hive; other bees will start running with these; and soon the whole colony will be in an uproar. Suddenly this boiling, seething mass will rush from the entrance and begin flying about in the air with a roar which may be heard for some distance, and we say, "a swarm is out." This swarm is made up of most of the field bees, as many of the younger bees as can fly, part of the drones, and the old queen. The bees fly about in a cloud for a few minutes then begin to cluster on some tree or fence near by. Nearly the entire working force of the colony has gone out, leaving in the old hive the nurse bees, a few drones, and those field bees which were in the field at the time the swarm issued. There are also a number of queen cells more or less fully developed. In a day or two a new queen will emerge, and unless the colony plans to swarm again soon, the bees will settle down to building up a new colony.

After the swarm is hived, it must draw out new combs, produce a new batch of brood, gather new stores of honey and pollen, and so gradually get back to storing strength. This will take time, and in the meantime the beekeeper is getting no, or at most very little, surplus honey from this part of his colony. The colony in the old hive must develop its queen to laying age. must develop a new force of field workers and lay

in new supplies of pollen and honey before it can again produce surplus honey. This will take longer than for the swarm since this colony has very few field bees left. From this discussion it will be evident that both parts of the original colony will not store as much surplus as the old colony would have done if it had not swarmed. It often happens that a colony which swarms at the beginning of the honey flow will not store any surplus from that flow, so it is best from the beekeeper's point of view to prevent swarming as far as possible.

Swarm Prevention.

Man cannot make bees do as he wishes unless he adapts his work to the natural instincts of the bees. In any attempt to control swarming, then, we must provide conditions which will be favorable toward honey production and away from queen cell building. Colonies differ very much in the persistency with which they carry out an idea. Some colonies will give up the idea of swarming very readily while others will persist in building queen cells in spite of all the beekeeper can do. Some colonies in some seasons will give up preparations for swarming after the beekeeper has killed their queen cells once or twice, while the next year, maybe, they will swarm out after the cells have been cut out repeatedly. Usually, however, if the beekeeper gives plenty of room in the brood nest and gives a super or two before they really need them, he can keep most of his colonies interested in storing honey.

If this method of cell killing is used as a swarm preventive measure, the beekeeper will have to look through his colonies very carefully every eight or ten days during the brood-rearing period preceding the honey flow, and kill all the cells. If he misses one, the colony will swarm. This method is very tedious and is not always effective, so some other plan may work better. A plan which provides conditions within the hive very much like those under natural swarming is named after the originator, the "Demaree Plan."

This, briefly, consists in raising all the frames of brood, except one, together with all the young bees, into an upper body, and confining the queen below under an excluder on this

one frame. The extra space in both bodies is filled with empty combs or full sheets of foundation, or combs of honey taken from the other body. This change is usually made after it becomes evident that the colony will not yield to simpler methods. If nectar is coming in freely at the time this change is made, ample room should be given by adding one or more supers. It is important in using this plan to get all the young bees out of the lower body where the queen is confined as they are the cell builders. It may be necessary in order to get all the young bees out of the lower body to shake the bees from it into the upper body. If the lower body is not fastened to the bottom board, it will be simpler to transfer the one frame of brood and the queen to the new body and let that become the bottom body. This plan produces conditions in the hive very much like those under natural swarming, but without the confusion and break in nectar gathering incident to it.

A modification of this plan which seems to work a little better, is to raise the body containing the brood above two supers so as to separate the brood farther from the queen. With extracted honey production this modified plan gives almost perfect success, but under comb honey conditions it does not work quite so well. The bees in the upper body will carry down some of the dark comb from the brood frames and use it in capping some of the sections. This of course damages the sections, but would not injure the frames for extracted honey.

There is no swarm prevention scheme which works satisfactorily for comb honey production. Some plans work better with some people than with others, so it is a matter for each beekeeper to work out a plan of his own, or to adapt one of the suggested plans to his conditions. Probably the most effective check to swarming is to provide the bees at all times a little more room than they can fill. Keep them hustling to fill up empty room in the hive! It is better to have an empty super on the hives a week too soon rather than a day too late.

Proper Supering for Comb Honey.

In any honey production, the beekeeper should keep track of the development of the flowers so as to know how fast the

nectar is coming in, and whether it is from one source or many. It is especially important for the comb honey producer to know when his best light honey is coming, because it does not pay to have any but the best honey put into sections. After the first super has been put on, a careful watch should be kept of the activity of the colony so that the second may be given in time. It is best to give the second super as soon as the bees are working well in the first. It is a mistake to wait until most of the sections in one super are capped before adding another, because the bees will be ready for the second some time before they have begun to cap the first. Nectar is from 50% to 80% water and this must be reduced to about 20% water before it is capped. This reduction is mainly brought about through evaporation, and evaporation can most rapidly be produced in a shallow container. When bees have conditions in the hive to suit them they will fill the cells only part full at first and add more as this evaporates and so continue until the cells are full. When a new super of foundation is given to them, they draw out a lot of the sections part way and use them for evaporation chambers while they are drawing out some more. If only one super is given and the second is not added until that one is partly capped, the bees will be in need of new evaporating space long before they get it.

It is usual in putting on new supers to add them next to the brood nest so that they will be near where the young bees are most plentiful, since these do most of the comb building. In adding a third super it is the usual practice to put the second on top, the first in the middle, and the third on the bottom, next the brood nest. In this way the young bees are induced to begin work on the new one and continue working on those already started. This method holds good during the first half of the honey flow, but as the flow begins to decline, the new super should be placed on top of the others, because we do not want the bees to start more than they can finish well, but we do want them to have extra room if the honey flow lasts longer than we think it will. They will use this extra super if they need it, but they will not enter it unless the flow keeps up well after they have filled the others.

Proper Supering for Extracted Honey.

Bees will enter extracting supers more readily and work in them better than they will in section supers, especially if they contain drawn combs. On this account it is not such a problem to get extracting supers accepted. If one has a few colonies only, he may follow the same plan as for comb honey supering. If he has a large number of colonies, and some out-yards, it will be better to add several supers at once. Many beekeepers who run scores of colonies, add all the supers which they expect to need at the beginning of the honey flow. Proper supering, in the final analysis, is a matter for each beekeeper to decide for himself, after taking into account all the factors which have any bearing upon the problem, viz., the weather, the condition of the honey plants, the activity of the colonies, the strength of the colonies, etc.

Handling Natural Swarms so as to Get the Most Honey.

Where the beekeeper is working for honey production primarily and cannot prevent swarming entirely, there are one or two ways of handling the colonies to get the best results. The one used most often with success is to move the old hive out of the way a little after the swarm issues, turning the entrance away, and to place a new hive exactly in the place occupied by the other. Have the new hive filled with drawn combs if possible, but at least with full sheets of foundation. Shake or smoke the swarm into a box or basket, and dump it in front of the new hive and see that it gets started into the hive. After all is quiet, turn the old hive about so that the entrance points in the same direction as the new, and leave them for ten days. If the old hive had supers on it when the swarm came out, these should be transferred to the swarm.

If conditions in the yard are such as to make it likely that the virgin in the old hive will be well mated, the colony may be allowed to produce its own queen, but it will make the colony build up quicker to provide it with a laying queen. This should be done soon after the swarm is hived, the queen cells left in the old hive being cut out previously. At the end of ten days the old hive may be taken to a new location and left to

build up into a new colony. If it is preferred not to have any increase, after the swarm is hived, the cells may be cut out and the old hive set over the new with an excluder between and left to develop the brood. In this way all the brood will be added to the colony and no increase made.

Another plan is to leave the old hive beside the new until all the brood has emerged; then shake the bees in front of the new hive and take the old hive away. With this plan all queen cells must be cut out at the time the swarm is hived and again in ten days so as to keep the colony queenless.

Best Time to Make Increase.

The best time to make increase is at swarming time or a little later. If some of the colonies reach maximum strength before the honey flow starts, they will begin to go backward unless something is done to keep up their interest in brood production. It is a good plan, if the beekeeper wishes increase, to make up nuclei from these strong colonies, by taking frames of brood and bees from them and giving these nuclei either ripe queen cells or laying queens.

This plan may be used also in seasons when the honey flow is delayed for any reason so that the colonies reach their peak of production too soon. Another method is to keep the colonies from building swarming cells as long as possible, but those which persist in building queen cells should be treated by the Demaree plan, and when queen cells in the upper body are nearly ready to hatch, remove the upper body to a new location and provide it with a laying queen or ripe cell from some other stock if you do not wish to breed from that one. In this way all the field force of the colony is kept together for the honey harvest, but the brood and young bees, which will not be old enough to gather much honey during that flow, are used in making the increase.

Unless the beekeeper has had some experience in rearing queens, and has such conditions in his locality that he can breed true, it will be much better to buy queens from some reliable breeder. There is more or less damage to queens from being shipped long distances through the mails, so it is always best to procure queens from the nearest reliable breeder.